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FLORAE MALESIANAE PRAECURSORES LXIII. NEW SPECIES OF MALESIAN ARISTOLOCHIACEAE

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SUMMARY

There are only two genera of the Aristolochiaceae, *Aristolochia* and *Thottea*, so far known to occur in Malesia. In the course of a revision of this family for the Flora Malesiana, some new species of both genera have been found. Eight new ones of *Thottea* were published in a precursor on that genus (Blumea 27, 1981, 301–332, f. 1–72). There are four new species of *Aristolochia* from Borneo and one more new *Thottea* from Sumatra to be described here.

1. Aristolochia decandra Ding Hou, *spec. nov.* – Fig. 1.

Caulis volubilis, leviter complanatus, 7.5–13 mm diam., aliquantum laevis, glaber. *Lamina* firma chartacea, suborbiculata vel late ovata, 13.5–22.5 x 11.5–18.5 cm, apice acuminata, basi profunde cordata, supra glabra, infra sparse puberula; nervis 5–7, flabellatis, venis laxus transversis vel reticulatis; petiolo crasso, 10–13 cm longo. *Inflorescentiae* axillares vel caulinae, paniculiformes, usque 15 cm longae, puberulae; bracteae ovatae, c. 2.5 mm longae, utrinque puberulae. Pedicellus et ovarium 4–5 cm longum, puberulum. *Flores* vivide lutei vel luteo-viridis. Perianthium curvum, extus puberulum; utriculus late ellipsoideus, 5–6.5 x 3.5–4 cm, glandibus intus 2, ellipsoideis, c. 1.5 mm longis; tubus c. 5 cm longus; limbus trilobatus, lobis linearibus, usque c. 9 x 1 cm. *Stamina* 10; antherae oblongi, c. 4 mm longi. Columna stylina 10 mm longa, decemlobata; lobi lanceolati, 2–3 mm longi, apice plerumque hirti. Capsula ignota.

Typus: Western Borneo (Kalimantan): lower Serawai R., near Mangu Landu, c. 112°30′ E, 0°30′ S, primary forest, river bank, 80 m alt., fl., *Hans Winkler 1256* (L).

Further specimens examined: W. Borneo (Kalimantan). Lebang Hara, river bank, alt. 180 m, fl., Hans Winkler 373 (L). Cultivated in Hort. Bog. Java, originated from the Bornean collection made by Mr. P. Dakkus, sub no.: XI.A.61 (sterile coll.: Herb. Bog. sheet no. 1392-170, 171 & 172, BO; Martati 138, BO, L), XI.D.32a (sterile coll., Herb. Bog. sheet no. 1392-165, 166, 167 & 168, BO), and XI.D.40a (sterile coll., Herb. Bog. sheet no. 1392-169, BO).

The type and another specimen of *Aristolochia decandra*, as cited above, were collected from western Borneo by Prof. Hans Winkler in 1924–25. Mr. P. Dakkus, former curator of the Botanic Garden, Bogor, who joined the 1925 expedition to Borneo with Prof. Winkler, brought back this plant for cultivation (from unpublished notes of Prof. C.G.G.J. van Steenis). From the plants of this species grown in the Garden, herbarium specimens, drawings and photographs have been made.

There are two line drawings of flowers made from the cultivated plants as mentioned above, one by Prof. L.G.M. Baas Becking and another by an unknown artist (indicated on the sheet as a new species by Prof. van Steenis). The latter drawing has been redrawn here (fig. 1 B) by Ruth van Crevel.

This is the only Malesian species of *Aristolochia* of which the flower has remarkably 10 stamens (against the normal number of 6), so the specific epithet has been chosen to indicate this distinctive character.

It is very interesting that this species is closely related to those of *Pararistolochia* of tropical Africa (cf. O. Poncy, Adansonia 17, 1978, 465–494, f. 1–9) by: 1) a flattened stem, appearing as '8' on cross section, 2) by being cauliflorous, 3) having a 3-lobed perianth, and 4) in the higher number of stamens. The fruits of *Pararistolochia* are indehiscent. Unfortunately, the fruit of this new species is not yet known.

2. Aristolochia naviculilimba Ding Hou, *spec. nov.* – Fig. 2.

Planta volubilis, usque ad 15 m alta; caulis subteres, 3–6 mm diam., glaber. *Lamina* chartacea, elliptica, 10.5–15 × 5.5–7 cm; apice breviter acuminata, basi rotundata vel obtusa, vel raro leviter concava; supra glabra, infra puberula; nervis 3 (5), flabellatis, venis 10–14, laxus transversis vel leviter curvis, venulis laxus reticulatis; petiolo c. 3 cm longo. *Flores* caulini, obscure lutei; bracteae lanceolatae vel ovatae, utrinque puberulae. Pedicellus et ovarium c. 3 cm longum, glabrum. Perianthium curvum, extus glabrum; utriculus subglobulosus, 10–12 × 9–10 mm, glandibus intus 2, ellipsoideis, 3–4 mm longis; tubus cylindraceus, c. 15 mm longus; limbus labiatus, ovato-oblongus or lanceolatus, naviculiformis a latere visus, 60–90 × 30–35 mm. *Stamina* 6; antherae oblongi c. 1 mm longi. Columna stylina c. 3.5 mm longa, sexlobata; lobi triangulares, c. 1 mm longi. Capsula ignota.

Typus: Borneo: Sarawak. Mt Poi, lower cave, forest gorge, rocks, alt. 600 m., fl., *Clemens 20292* (K; iso in A).

Further specimens examined: Borneo: Kalimantan. Mt Kasian, fl., Jaheri 1038 (BO); Mt Liang Gagang, Hallier f. 2787 (p.p., flowers only; mixed with stem and leaves of Vitaceae) (BO).

The leaves of *A. naviculilimba*, at a glance, resemble those of another Bornean species, *A. transtillifera*. However, the leaves of these two species can be easily distinguished when they are examined with a handlens or even by the naked eye; those of *A. naviculilimba* are chartaceous, puberulous beneath, with 10–14 rather loose, transverse or slightly curved cross-veins and loose, reticulate veins, while those of the other species are subcoriaceous, glabrous, with many distinctly transverse cross-veins

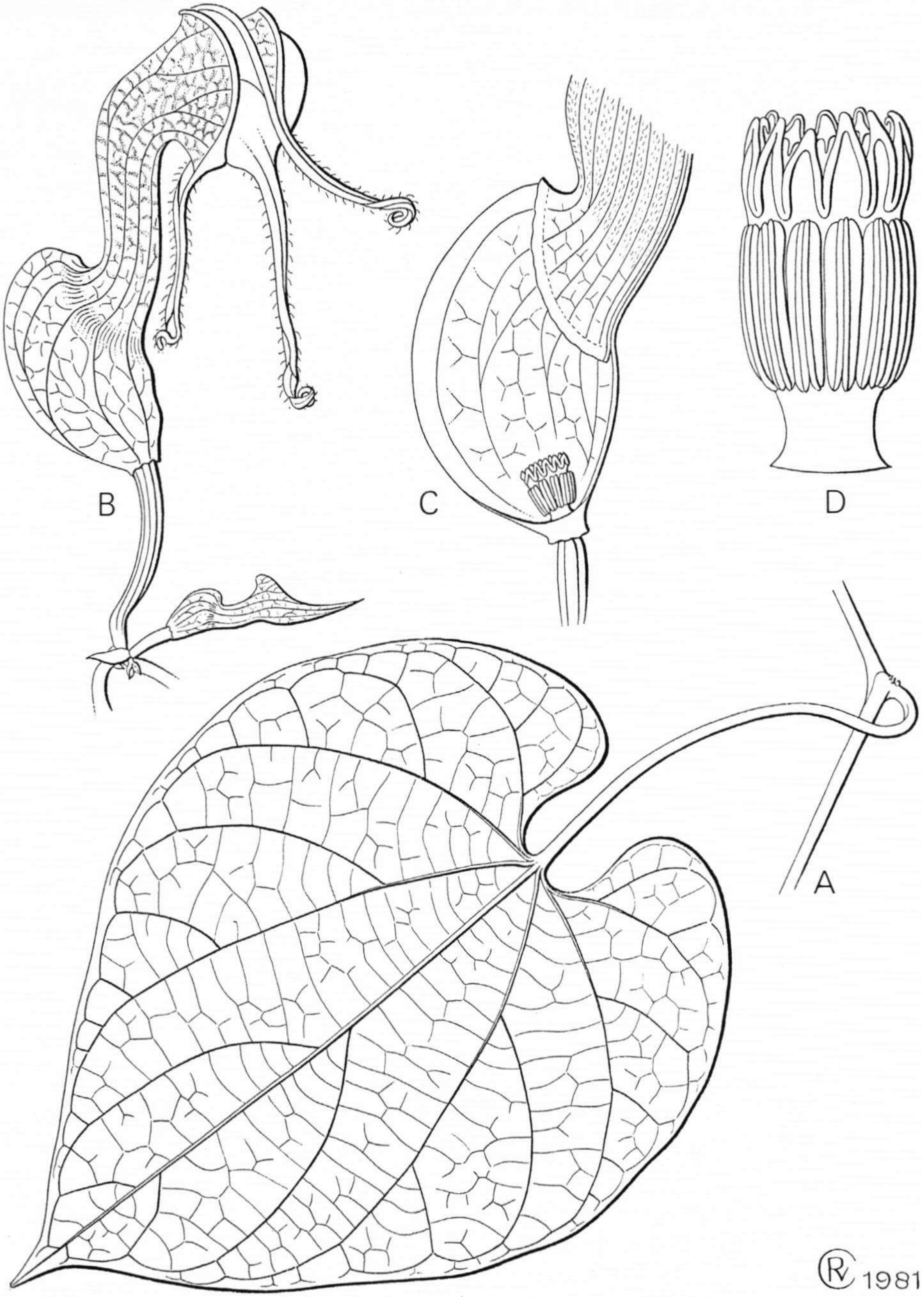


Fig. 1. *Aristolochia decandra* Ding Hou. – A. Leafy branch, x ½; B. one young flower bud and an open flower, x ½; C. longitudinal section of lower part of perianth showing the gynostemium inside the utricle and the base of the tube slightly elongating and projecting into the utricular cavity, x 1; D. gynostemium, x 5. (A. *Hans Winkler 1256*; B. after a drawing in the collection of Prof. van Steenis; C & D. *Hans Winkler 373*).

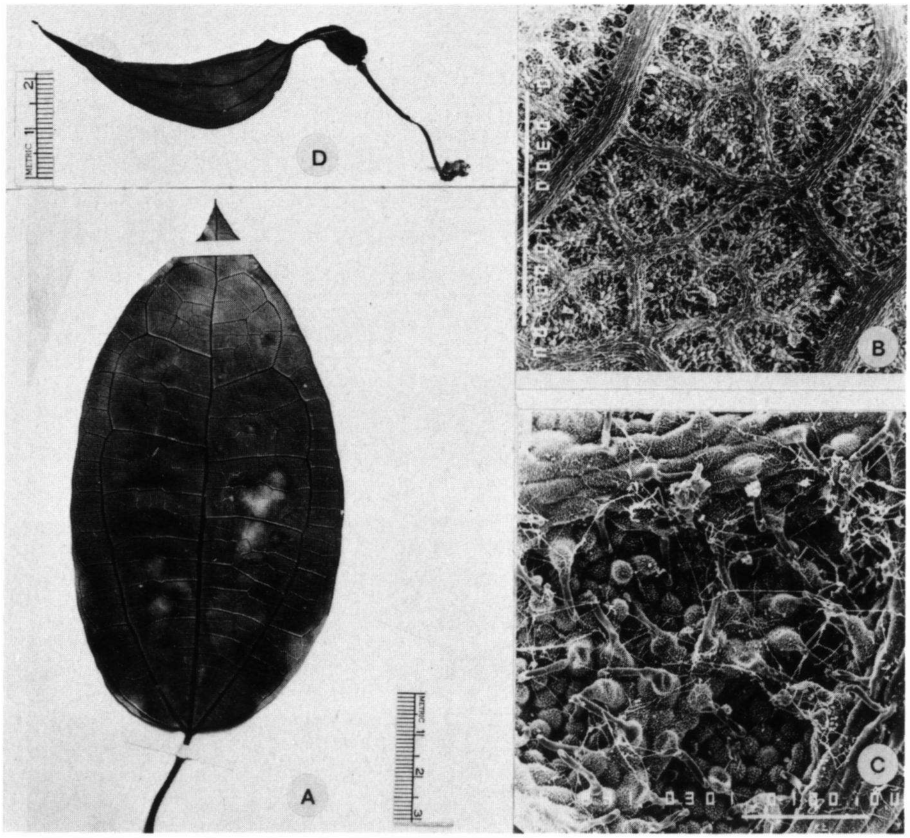


Fig. 2. *Aristolochia naviculilimba* Ding Hou. – A. Leaf, abaxial surface; B & C. scanning electron micrographs of abaxial leaf surface; D. lateral view of a young flower (B x 31; C x 170). (A & D. *Clemens 20292*, K*; B & C. *Jaheri 1038*, BO). — *Herbarium of deposition of the specimen used. If a specimen is not followed by the usually used symbol of herbarium name, it is preserved in L.

and closely reticulate veins. Unfortunately the fruits of the present species and the flowers of the other species are not known.

The epithet of this new species alludes to the boat-shaped limb, in side view, of especially a not yet opened flowers.

3. Aristolochia papillifolia Ding Hou, *spec. nov.* – Fig. 3, 5 A–C.

Planta volubilis usque ad 15 m alta; caulis teres, 1.5–2.5 cm diam., longitustrorsum sulcatus vel porcatus. *Lamina* subcoriacea, late ovata or ovata, 13–19 x 9–15.5 cm, apice acuta vel breviter acuminata, basi subtruncata, leviter concava vel rotundata, supra glabra, infra papillosa; nervis 5, flabellatis, venis laxus transversis vel reti-

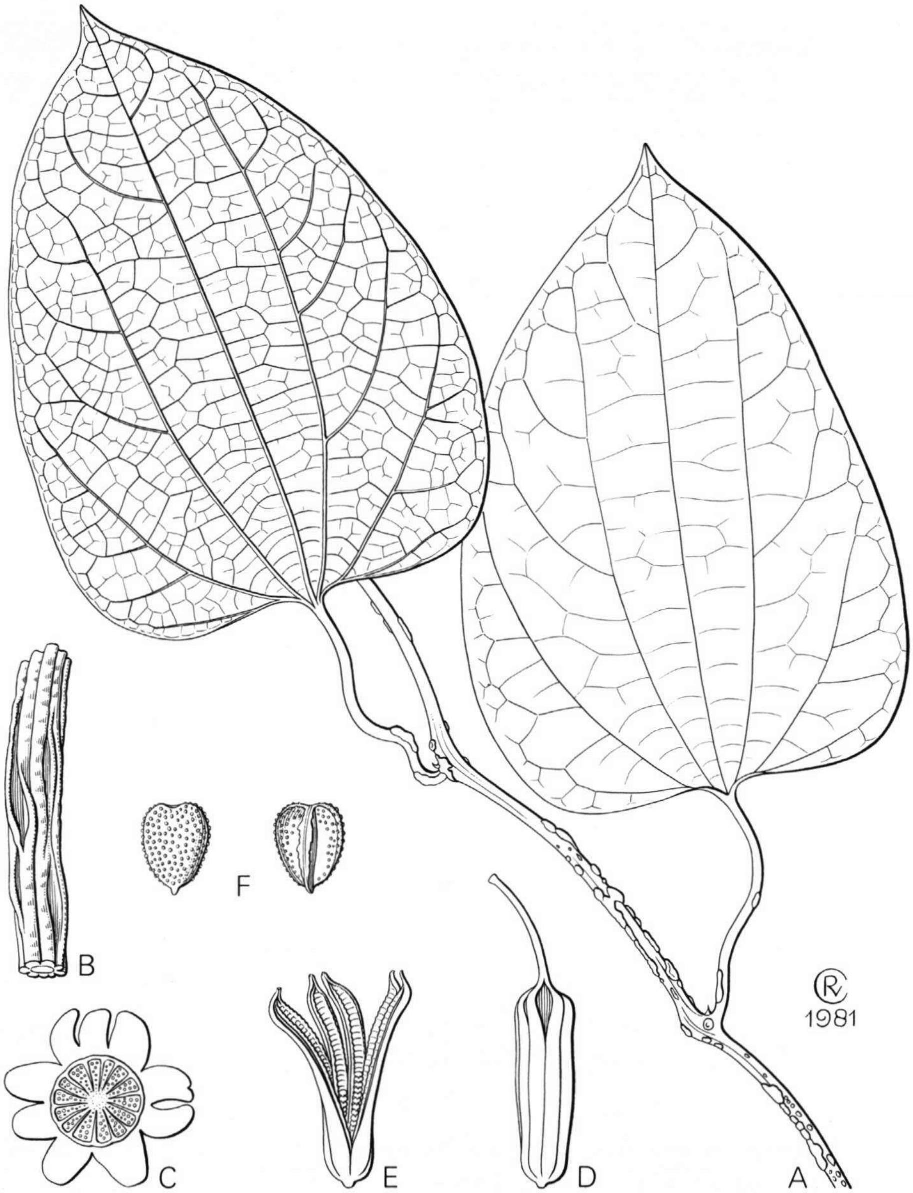


Fig. 3. *Aristolochia papillifolia* Ding Hou. – A. Leafy branch with conspicuous lenticels, x ½; B. part of a stem showing the longitudinally furrowed and ridged bark, x ½; C. cross section of stem showing the rather thick bark and the vascular bundles separated by medullary rays, x 2; D. fruit in hanging position, x ½; E. open fruit in hanging position, dehiscing from base towards apex, x ½; F. immarginate seed, showing both surfaces, x 3. (A–C. *SAN 34658*; D–F. *SAN 17334*).

culatis; petiolo crasso, 6–12 cm longo. Bracteae lineares, 3.5–5 mm longae, glabrae. Pedicellus et ovarium 3–4 cm longum, glabrum. *Flores* caulini, extus glabri. Perianthium rectum; utriculus ellipsoideus vel subglobulosus, 6–7.5 × 5–6 mm, glandibus intus 6, ellipsoideis vel orbiculatis, c. 1.5 mm longis; tubus 15–20 mm longus; limbus unilabiatus, linearis, 45–50 × 7–12 mm. *Stamina* 6; antherae oblongi, c. 0.7 mm longi. Columna stylina, 2 mm longa, sexlobata; lobi deltati, c. 1 mm longi. *Capsula* cylindracea, 6.5 × 1.3 cm. Semina late ovata, c. 4 × 3 mm, immarginata, utrinque verruculosa.

Typus: Borneo: Sabah. Sandakan Dist., Lungmanis, secondary forest, fl. & fr., *Mikil SAN 34658* (L; iso in K).

Further specimens examined: Borneo: Sabah. Tawau Dist., Kelumpang Balong, primary forest, ridge top, alt. 45 m, fr., Bakar SAN 17334 (K, L, SAN); Tongod Dist., Pinangah, dipterocarp forest, hill slope, alt. 180 m, fr., Dewol Sundaling SAN 93778 (L). Sarawak. Gunung Buri, 75th mile, 1st/2nd Division boundary, on hill top in disturbed mixed dipterocarp forest, c. 600 m alt., young fr., Paul Chai et al. S 36697 (K, L).

Aristolochia papillifolia can easily be recognized by the leaf characters. The leaves are subcoriaceous, glabrous, broad ovate or ovate, and palmately 5-nerved. On the lower leaf surface, the areolae are papillose, distinctly shown under the dissecting microscope at a magnification of about × 40, and there are many cavities visible within papillae groups (fig. 5 A). At a higher magnification, one may observe that there is one stoma in the cavity surrounded by papillate cells (fig. 5 C). This is the only Malesian species with such papillate leaves, so the specific epithet is chosen to indicate this characteristic feature of the leaf.

The 1-lipped perianth has 6 (against usually only 2) glands on the inner surface of the utricle. The higher number of the glands so far known only occurs in one other Malesian species (*A. foveolata*, with leaves puberulous beneath) and in a western tropical African species, *Pararistolochia mannii* (Hook. f.) Keay (leaves 5-lobed; perianth 3-lobed, with 5? or 4? glands, cf. Poncy, Adansonia 17 (1978) 478, t. 9, f. 1).

4. **Aristolochia transtillifera** Ding Hou, *spec. nov.* – **Fig. 4, 5 D–I.**

Caulis volubilis, teres, 3.5–6 mm diam., leviter striatus, glaber. *Lamina* subcoriacea, ovate-oblonga, oblongo-elliptica, raro ovata, 16–20 × 6.5–10 cm, apice breviter acuminata, basi obtusa, interdum leviter concava vel subtruncata, utrinque glabra; nervis 3(–5), flabellatis, venis multis distincte transversis, venulis arte reticulatis; petiolo 3–8 cm longo. *Flores* ignoti. *Fructus* caulini; bracteae lanceolatae, 2–6 mm longae, utrinque leviter puberulae. *Capsula* cylindracea, 3–3.5 × 1.3 cm; pedicellus c. 3.5 cm longus. Semina triangularia, 5 × 4.5 mm, immarginata, utrinque verruculosa.

Typus: Borneo. Sabah, Beaufort Dist., Beaufort hill, primary forest, c. 30 m alt., fr., *Rivera SAN 19008* (L; iso in K, SAN).

This species is only known from the type collection in fruit as cited above. It can easily be recognized by the subcoriaceous, uniquely glabrous leaves with obtuse base

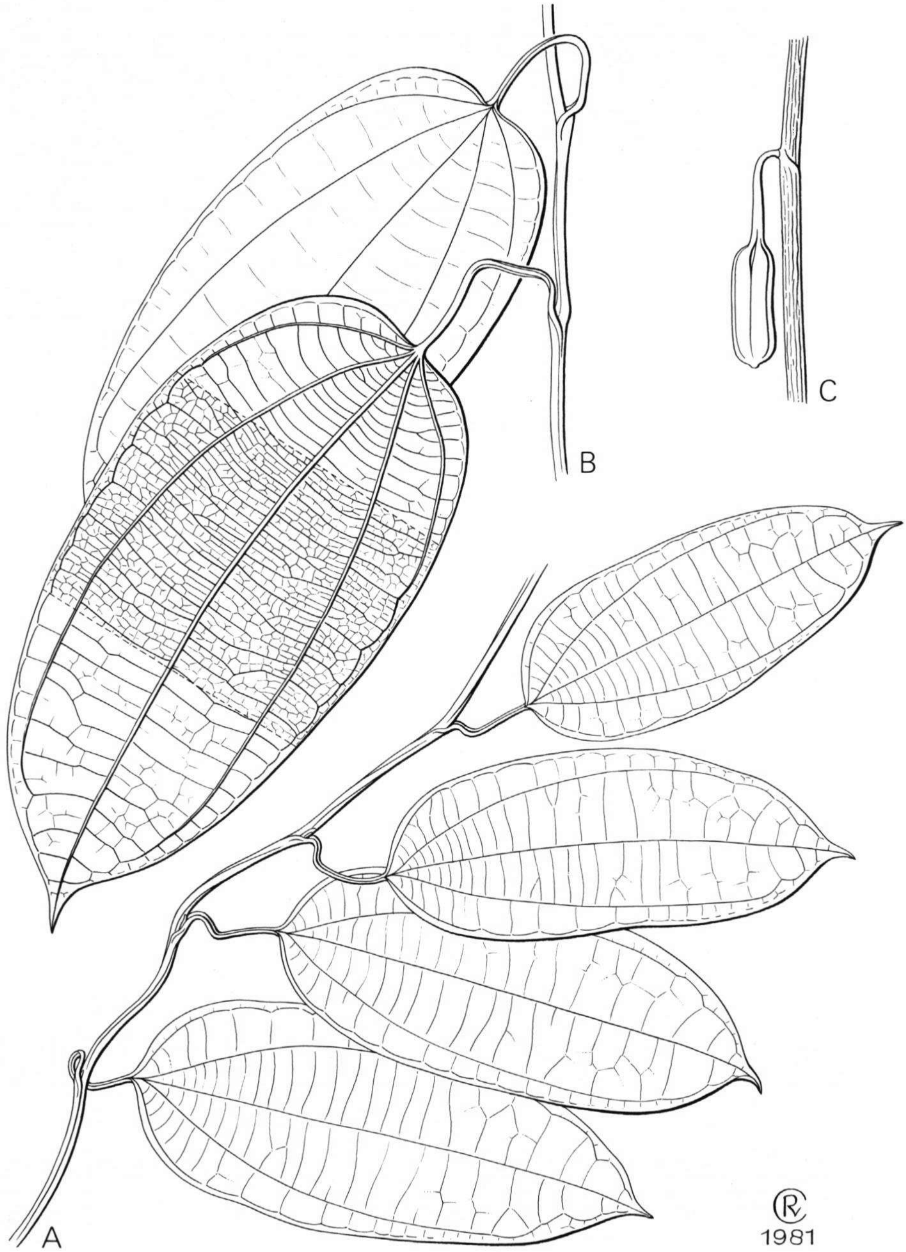


Fig. 4. *Aristolochia transtillifera* Ding Hou. – A. Upper part of a leafy branch, x ½; B. lower part of a leafy branch, x ½; C. fruit in hanging position, x ½. (A & C. *SAN 19008*, SAN; B. *SAN 19008*).

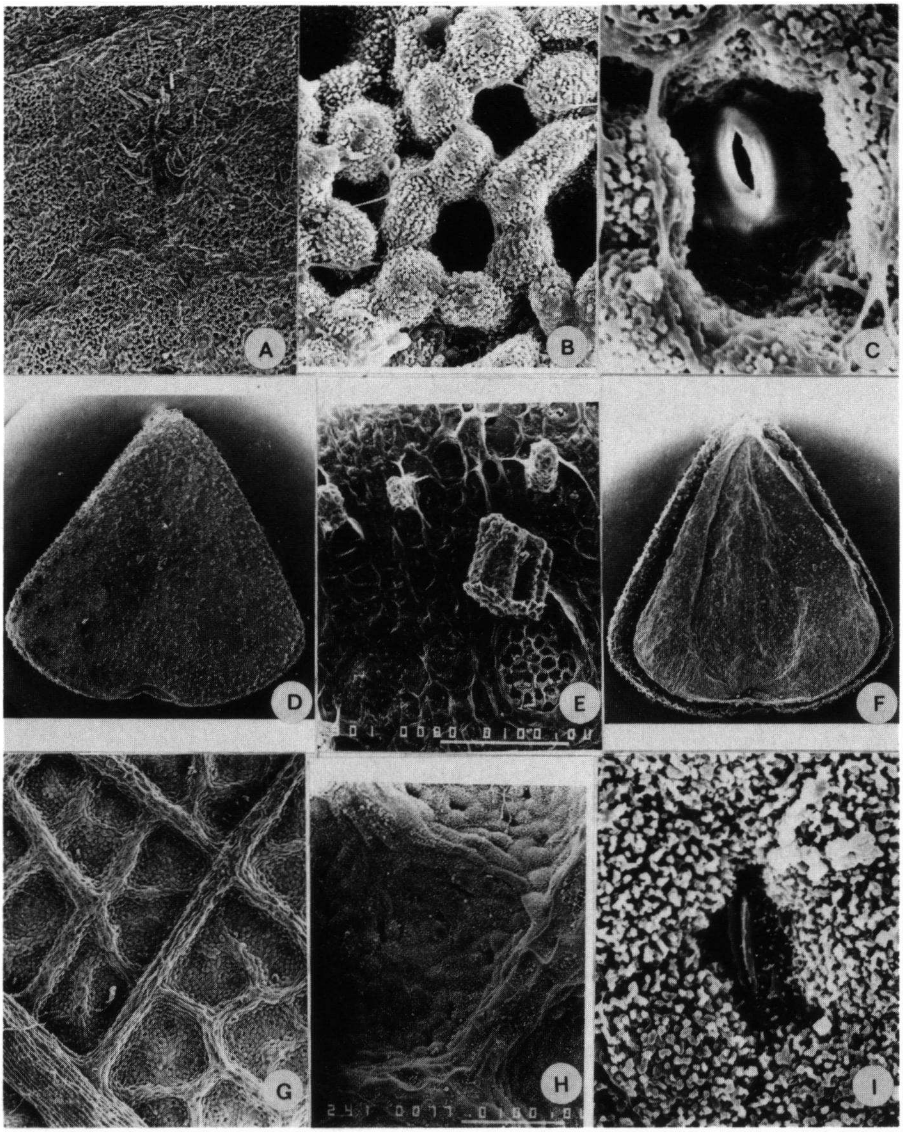


Fig. 5. Scanning electron micrographs of abaxial leaf surfaces and seeds of *Aristolochia*. – *A. papillifolia* Ding Hou, leaf surface (*SAN 34658*): A. veins and veinlets flat, with one small mite photographed upside-down on the surface, x 37; B. cavities surrounded by papillate cells, each cavity containing one stoma (not shown), x 700; C. one stoma in the cavity, x 1500. – *A. transtillifera* Ding Hou (*SAN 19008*), D–F. seed: D. abaxial surface, x 8, E. ditto, showing irregular, small wart-like outgrowths of the testa, x 170, F. adaxial surface, showing the expanded funiculus covering the seed, x 8; G–I. abaxial leaf surface: G. with prominent vein and veinlets, x 35, H. with compact papillae, x 140, I. showing one stoma in the cavity, x 1200.

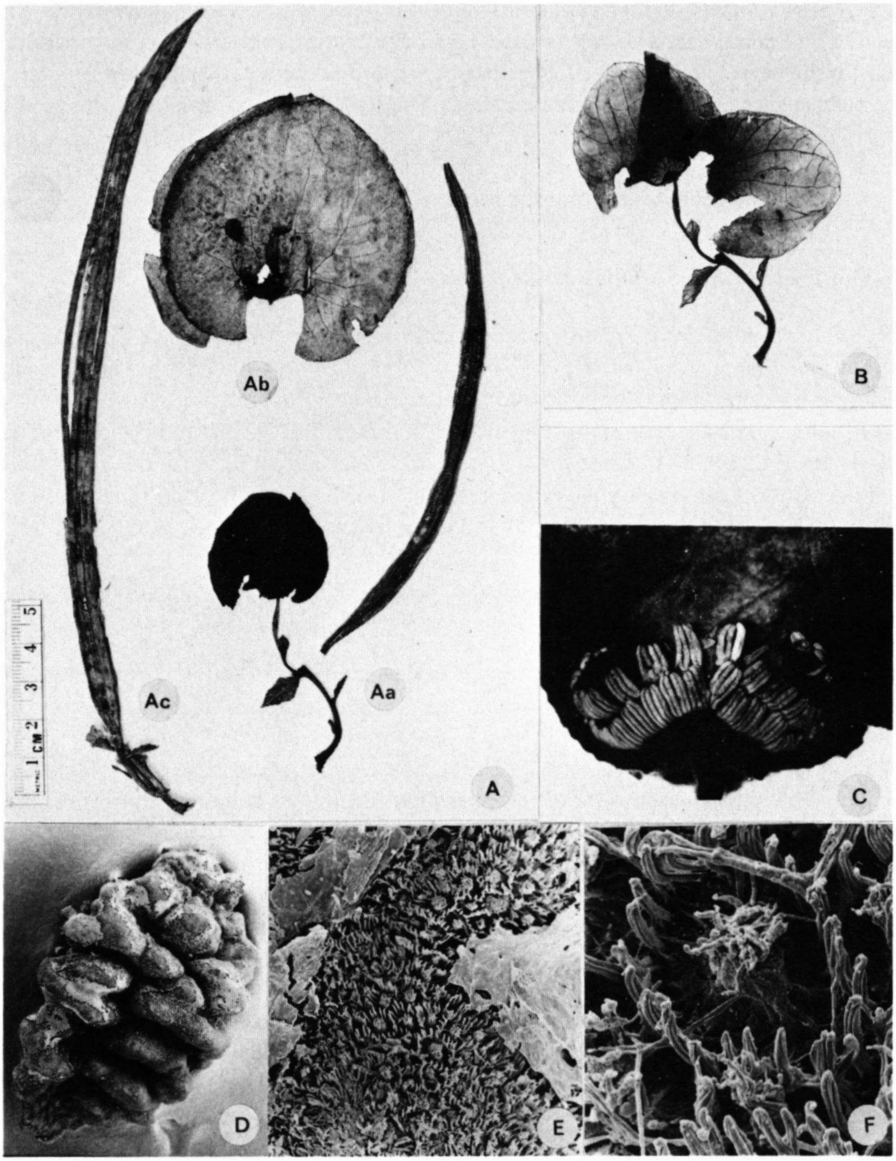


Fig. 6. *Thottea straatmanii* Ding Hou. – A. Habit, x ½: Aa. short fertile branch with one flower bud and one detached (young) fruit, Ab. folded perianth in lateral view, Ac. short fruiting branch; B. flower bud of Aa with the perianth expanded, x 2/3; C. enlarged basal part of the perianth shown in B, showing the gynostemium at the base with stamens arranged in two series, x 4; D–F. scanning electron micrographs of seed: D. seed, x 14, E. surface view of the testa, most of the cells with periclinal walls peeled off, x 150, F. one cell as shown in E, x 1000. (All from *Straatman s.n.*).

which is sometimes slightly concave or subtruncate. The leaves are palmately 3(–5)-nerved and closely reticulately veined. There are many transverse veins ± perpendicular to the nerves and the specific epithet refers to this characteristic feature.

This species appears to be related to *A. foveolata* Merr. and *A. papillifolia* by the leaves with palmate nerves, cylindric fruits and immarginate seeds. However, it can easily be distinguished from those two species by the remarkably glabrous leaves with many transverse veins connecting the palmate nerves.

5. **Thottea straatmanii** Ding Hou, *spec. nov.* – **Fig. 6.**

Folia non visa. *Inflorescentiae* prope basim caulis (?), spiciformis, 2 cm longae, puberulae; bracteae ovatae, 4.5–13 × 2.5–8 mm, utrinque puberulae. Pedicellus et ovarium c. 17 mm longum, puberulum. *Perianthium* ± orbiculatum a latere visum, c. 7 cm diam., basi cordatum, profunde lobatum; lobi ± 7 cm diam., extus puberuli, intus laxus glanduliferia. *Stamina* biseriata, serie superiore c. 18, inferiore c. 24; filamenta glabra. Columna stylina c. 3 mm longa, lobi c. 12, c. 1.5 mm longi. *Capsula* siliquiformis, 15–21 cm longa, puberula. Semina late ellipsoidea c. 3.5 × 2 mm, transverse rugosa, profunde sulcate.

Typus: Northeastern Sumatra. East Coast, Laut Tador and Gedon Biara Estate, fl. & fr., *Straatman s.n.* (L).

The type of this species consists of flowering and fruiting material which was collected by an entomologist, Mr. R. Straatman, in northeastern Sumatra. It is one of the samples of food plants for the larvae of butterflies collected and is preserved in the Rijksherbarium, Leiden.

The flower (with perianth c. 7 cm diam.) is the second largest in this genus. It is only smaller than that of *T. grandiflora* (with perianth up to c. 12.5 cm long).

This species is easily recognized or can be distinguished from other species of the genus by the rather large and characteristic flower: the perianth when folded in side view is more or less orbiculate in outline, c. 7 cm diam., cordate at the base and distinctly biauriculate. The species is closely related to *T. reniloba* from northern Sumatra by the spaced bracts and distinct internodes of the inflorescences, deeply lobed perianth, biseriate stamens, pubescent capsules, and deeply grooved seeds. Unfortunately, there is no herbarium collection of leaves of this new species. Based on flowering and fruiting characters, this species differs from *T. reniloba* by: 1) the large, more or less orbiculate perianth lobes, c. 70 mm long and wide (against small, reniform lobes, 5–6 mm long, 11–12 mm wide), 2) higher number of stamens: upper row c. 18, lower c. 24 (against upper row 9 or 10, lower 9–14), and 3) seeds transverse-rugose (against tuberculate).

Mr. Straatman on his visit to Leiden in September 1981, kindly gave useful information on the plant of this species. The original habitat, where the plant was found, has been transformed into farm land. This plant grew very locally in wet shady places in open forest, up to c. 2.5 m high. He also made a sketch of the leaf, which is ovate-oblong, up to c. 30 cm long, with a larva of the butterfly feeding along the margin.